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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/075,055	02/13/2002	Martin J. Murphy	6059.12004	7453

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EXAMINER

DEB, ANJAN K

ART UNIT	PAPER NUMBER
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2858

DATE MAILED: 07/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/075,055

Applicant(s)

MURPHY ET AL.

Examiner

Anjan K Deb

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 July 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 24-32 and 52-106 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 24-32 and 52-106 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4. 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 24-32, 52-60 are rejected under 35 U.S.C. 102(b) as being anticipated by Pifer et al. (US 4,914,444).

Re claims 24,52 Pifer et al. discloses lightning detection system comprising plurality of data sources (10-13), a central analyzer 16 including a discharge correlation component for correlating discharge data from the sources for determining time and location of discharge (column 3 lines 52-56)(Fig. 1).

Re claims 25-27, 53 Pifer et al. discloses lightning data discharge sets from plural sources are correlated in time (Fig. 2) and difference in propagation time is used to locate highest amplitude discharge (column 4 lines 26-48).

Re claims 28-29,31-32, 54-60 Pifer et al. discloses data sets are shifted in time (matching time intervals) for estimating reliability of correlation (maintain synchronization) when time intervals for all sensors agrees to within a predetermined maximum value (5 seconds) (column 3 lines 66-68, column 4 lines 1-48).

Re claims 30,58 Pifer et al. discloses lightning event is detected by two of the direction finders or detectors 10-13. Finding direction is broadly interpreted as determining angle.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 61-62, 70-75, 78-80, 86, 94-102, are rejected under 35 U.S.C. 103(a) as being unpatentable over Pifer et al. (US 4,914,444) in view of Pabst et al. (US 6,164,130).

Re claims 61-62, 70, 86, 94-97, Pifer discloses all of the claimed limitations as set forth above including an antenna for detecting electromagnetic field of a lightning discharge.

Pifer did not expressly disclose an analog-to-digital converter and data compression component for transmitting lightning discharge data over a communication to a central station for processing by a digital processor.

Pabst et al. discloses lightning discharge (electromagnetic signal) measuring system comprising analog to digital converter providing digital output of detected electromagnetic

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signal for processing by a digital processor. Communication channel and data compression is inherent to digital data communication.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Pifer et al. by adding analog to digital converter disclosed by Pabst et al. for processing by a digital processor for determining the location of lightning discharge (atmospheric event).

Re claims 71-75, 80, 98-102 Pifer et al. discloses data sets are shifted in time (matching time intervals) for estimating reliability of correlation (maintain synchronization) when time intervals for all sensors agrees to within a predetermined maximum value (5 seconds) (column 3 lines 66-68, column 4 lines 1-48).

Re claims 78-79, 100 Pifer et al. discloses lightning event is detected by two of the direction finders or detectors 10-13. Finding direction is broadly interpreted as determining angle.

5. Claims 76-77, are rejected under 35 U.S.C. 103(a) as being unpatentable over Pifer et al. (US 4,914,444) and Pabst et al. (US 6,164,130) in view of Kenneth et al. ["The US National Lightning Detection NetworkTM and applications of cloud-to-ground lightning data by electric power utilities", Cummins, K.L.; Krider, E.P.; Malone, M.D.; Electromagnetic Compatibility, IEEE Transactions on , Volume: 40 Issue: 4 , Nov. 1998, Page(s): 465 –480).

Re claims claim 76-77, Pifer et al. and Pabst et al. discloses all of the claimed limitations as set forth above except an optimization component.

Kenneth et al. discloses least square optimization procedure for determining optimum location (page 469 column 1 para 2) and time (page 472 column 2 para 3)].

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Pifer et al. and Pabst et al. by adding optimization component disclosed by Kenneth et al. for determining optimum location and time of lightning discharge from plurality of redundant data.

6. Claims 84-85, are rejected under 35 U.S.C. 103(a) as being unpatentable over Pifer et al. (US 4,914,444) in view of Kenneth et al. ["The US National Lightning Detection NetworkTM and applications of cloud-to-ground lightning data by electric power utilities", Cummins, K.L.; Krider, E.P.; Malone, M.D.; Electromagnetic Compatibility, IEEE Transactions on , Volume: 40 Issue: 4 , Nov. 1998, Page(s): 465 –480).

Pifer et al. discloses all of the claimed limitations as set forth above except an optimization component.

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Kenneth et al. discloses least square optimization procedure for determining optimum location (page 469 column 1 para 2) and time (page 472 column 2 para 3)].

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Pifer et al. by adding optimization component disclosed by Kenneth et al. for determining optimum location and time of lightning discharge from plurality of redundant data.

Claims 61-69, 81-83, 87-93, 103-105 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pifer et al. (US 4,914,444), Pabst et al. (US 6,164,130), in view of Coffey et al. (US 6,492,929 B1).

Re claims 61-69, 81-83, 87-93, 103-105 Pifer et al., discloses producing amplitude and time data of lightning discharge.

Pifer et al. as modified by Pabst et al. did not expressly disclose data compression and data decimation component.

Coffey et al. (US 6,492,929 B1) discloses a method of data compression suitable for sampling lightning (column 2 lines 63-65) discharge data characterized by short-term amplitude excursions using analogue to digital converter for digital conversion with non-uniform sampling. Non-uniform sampling is broadly interpreted as including data decimation.

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Pifer et al. as modified by Pabst et al. by adding data compression and data

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decimation component disclosed by Coffey et al. for sampling lightning discharge data so as to minimize the time required for processing a series of lightning discharge data.

7. Claim 106 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pifer et al. (US 4,914,444), Pabst et al. (US 6,164,130), and Coffey et al. (US 6,492,929 B1) in view of Kenneth et al. [“The US National Lightning Detection NetworkTM and applications of cloud-to-ground lightning data by electric power utilities”, Cummins, K.L.; Krider, E.P.; Malone, M.D.; Electromagnetic Compatibility, IEEE Transactions on , Volume: 40 Issue: 4 , Nov. 1998, Page(s): 465 –480).

Re claim 106, Pifer et al. as modified by Pabst et al. and Coffey et al. discloses all of the claimed limitations as set forth above except least-square estimation of optimum time and location.

Kenneth et al. discloses least square optimization procedure for determining optimum location (page 469 column 1 para 2) and time (page 472 column 2 para 3)].

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Pifer et al. as modified by Pabst et al. and Coffey et al. by adding least-square estimation disclosed by Kenneth et al. for determining optimum location and time of lightning discharge from series of lightning discharge data.

Pertinent Art

8. Kuzma et al. (US 5,295,071) discloses sampled data lightning strike detection and mapping system capable of generating frequency spectrum of input signal waveforms and displaying such on the mapping display comprising antenna coupled to A/D converter for transmitting digital data of detected lightning discharge signal over a communication channel to a digital processor for evaluation.

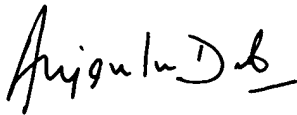
Frankel et al. (US 5,140,523) discloses spatial and temporal prediction of lightning discharges using correlated data (correlation network) from plurality of sensors (array of DF antennas 4) and processed by a digital processor (column 4 lines 65-68, column 5 lines 1-14)(Fig. 2).

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Contact Information

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Anjan K. Deb whose telephone number is (703) 308-2941. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, N. Le, can be reached at (703)-308-0750.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone numbers are (703)-308-0956 and (703)-305-4900.



Anjan K. Deb

Patent Examiner

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7/23/03

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